Forest Stewardship Council®
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FORESTS FOR ALL FOREVER™

THE CONTRIBUTION OF FSC CERTIFICATION TO BIODIVERSITY IN ESTONIAN FORESTS

FSC works towards sustainable forestry by promoting environmentally appropriate, socially beneficial, and economically viable forest management. This is manifested in Estonia through the FSC Interim Standard for Assessing Forest Management in Estonia (herein referred to as the FSC standard). This report explores the effects of the requirements in the FSC standard on biodiversity in the Estonian forest. Using scientific literature, the requirements were compared to Estonian legislation on forest management to demonstrate some of the ways in which FSC certification provides additional benefits for forest biodiversity. Six aspects were highlighted where the FSC standard provides clear and/or quantifiable benefits for biodiversity over legislation: 1) Woodland Key Habitats, 2) Native tree species, 3) Mixed forests, 4) Retention trees, 5) Dead wood, and 6) Forest drainage. This factsheet is a summary of the report *The contribution of FSC certification to biodiversity in Estonian forests*.

WOODLAND KEY HABITATS

The FSC standard requires all Woodland Key Habitats to be protected, whereas legislation only requires Woodland Key Habitats below 7 ha in size to be protected. Protecting forest areas from economic activity benefits forest biodiversity by providing intact forest patches and old-growth features that can develop over time, such as old and large trees, a high input of dead wood, and high structural variability. Estonian studies have shown that a higher diversity of birds and threatened species of fungi can be sustained in old-growth forests than managed forests. Woodland Key Habitats have also been shown to host a higher abundance of old-growth features, providing important habitats for many threatened species. Saving the larger Woodland Key Habitats may also increase the connectivity of protected forest patches, which can allow species with large habitat requirements or short dispersal ranges to persist in the landscape.

NATIVE SPECIES

The FSC standard provides considerations for native tree species above that of legislation by prohibiting the cultivation of non-native tree species, as well as requiring the existing proportion of all native noble hardwoods to be retained in FSC-certified forests. Native Estonian tree species are adapted to Estonian forest ecosystems, and are thereby more likely to support biodiversity and contribute to ecosystem stability, function and resilience than non-native tree species. Many Estonian noble hardwoods are particularly important for biodiversity. The noble hardwoods oak (*Quercus robur)* and ash *(Fraxinus excelsior)* both host significantly more red-listed lichen species than other trees. Many specialist species also rely on native noble hardwoods to survive. FSC requirements retain a greater diversity of native noble hardwoods, as well as the biodiversity features they provide.

Remnant oak in a Woodland Key Habitat. Woodland Key Habitats are forest patches important for biodiversity containing a forest structure and various habitats important for rare, threatened and endangered species. Oak is one of the noble hardwoods, a group of tree species with high cultural and historic value that are considered important for biological diversity in forests. Photo by RMK/ Jüri Pere.

OVERVIEW OF FSC IMPACT

This table shows an overview on how different environmental aspects are treated in the Estonian legislation and in the FSC standard, what differences that can be found in an FSC certified forest compared to a forest only following the legislation and how this contributes to biodiversity. The impact of FSC certification has been quantified, when possible. The assessment shows the contribution of the FSC-standard.

Environmental Aspect	Estonian Legislation	FSC Standard	Difference in the Forest	Impact on biodiversity	Quantification	Assessment
Protected areas and habitats	Key habitats, including habitats of protected species, brown bear hibernation sites, nesting trees, nesting periods, and WKHs < 7 ha are protected.	All WKHs and habitats of protected species are protected. No harvesting during nesting periods and in nesting areas of protected species.	WKHs > 7 ha are protected. Biodiversity features, including old-growth features, are promoted.	More habitats and higher connectivity for species requiring late-successional forest.	An additional 4000 ha of WKHs protected in FSC-certified forests.	✓
Native tree species	Damage to the forest ecosystem and gene pool is prevented. Exotic tree species may be used in reforestation when suitable.	Exotic species are not used in forest regeneration, except with special permission. European yew and native noble hardwoods are preserved in forests.	Native tree species maintained at a higher proportion and diversity. Low proportion of exotic species.	Species-specific benefits from more native tree species. Red-listed species associated with noble hardwoods favored.	Not quantifiable.	✓
Mixed forests	-	Economic activity in forests favors the development of mixed forests.	Higher diversity and proportion of deciduous trees in forests.	More habitats for birds, epiphytes, etc. connected to deciduous or mixed stands.	Not quantifiable.	✓
Retention trees	5 m³ volume of biodiversity trees, living or dead, with priority to large trees with high natural value, are retained per ha in harvests (or 10m³ per ha when the harvest area exceeds 5 ha) through subsequent generations.	10 *living* biodiversity trees (or 5 noble hardwood trees) are retained per ha in harvests, through subsequent generations. Priority to large trees with high biodiversity value. Old or hollow trees and trees with bird nests are retained.	More trees retained in harvests. Minimum 10 living trees retained, as well as all old and hollow trees or trees with bird nests.	Retention trees function as 'lifeboats' for forest species. Future inputs of dead wood are secured.	More than 80 000 trees retained annually in FSC-certified Estonian forests.	✓
Dead wood	Standing dead trees may be preserved as retention trees.	All standing dead trees and dead wood with diameters above 25 cm are preserved.	Dead wood of many species/age classes retained in forests, as well as over time.	Habitats for a large array of species dependent on dead wood, including many red-listed species.	Not quantifiable.	✓
Forest drainage	Regulation of the forest water regime is permitted with some restriction. Management shall not endanger the forest soil or water regime.	Drainage of previously undrained forests is prohibited.	No new drainage of forests.	Wet forest ecosystems are preserved with unique biodiversity features.	Approximately 300 000 ha of wet forests remain undrained.	✓
Landscape planning	Large-scale management including establishment of protected areas along shores and banks, in spawning areas of salmon, trout and grayling, and along animal migratory routes.	Landscape-level impacts of forest management are considered, including the conservation of viable forest edges.	Some landscape-level aspects considered in management.	Cannot be estimated.	Not quantifiable.	?
Forest roads	-	Negative environmental impacts of planned road construction are assessed and avoided.	Roads are better planned to avoid negative impacts on water.	Cannot be estimated.	Not quantifiable.	?
Damage to ground and water	The forest nutrition and water regime, and the soil more than 30 cm below ground, shall not be substantially damaged.	Soil erosion and damage to unstable or wet soil types shall be avoided. Forwarding and harvesting are prohibited during wet spring and autumn seasons on vulnerable soils.	Some extra considerations made to avoid damage to forest soil and water regimes.	Cannot be estimated.	Not quantifiable.	?

MIXED FORESTS

The FSC standard requires mixed stands of coniferous and deciduous tree species to be developed in forests. With high-volume production in focus in modern forestry, the proportion of deciduous trees has decreased in favor of coniferous monocultures. Mixed forests are shown to be particularly beneficial for retaining diverse bird communities, while many deciduous species are also vital for maintaining tree-living fungi and lichens. Mixed forests also often harbor more tree species than coniferous or deciduous forests, which can increase ecosystem resilience, and provide habitats and food for a larger diversity of tree-dependent species. A study comparing old-growth forests and FSC-certified mature forests in Estonia showed no significant difference in tree diversity and abundance between the two forest types, showing that the FSC forest may retain a more natural tree species composition.

RETENTION TREES

The FSC standard requires a minimum of 10 living biodiversity trees per ha to be retained forever in clearcuts. In comparison, Estonian legislation requires 5 m³ and 10 m³ of wood volume to be retained per ha in clearcuts below and above 5 ha in size, respectively. Assuming that retained trees consist of 1 – 1.5 m³ wood volume each, the FSC specified amount is 2 – 3 times higher than specified by legislation for clearcuts smaller than 5 ha, and at least matches the amount specified by legislation for larger clearcuts. Additionally, trees retained according to the FSC standard are required to be living, while legislation allows retained trees to be alive or dead; as such, trees retained by law could consist only of dead trees or a small proportion of living trees. Both legislation and the FSC standard require large and biologically valuable trees to be retained, while the FSC further specifies retention of all old and hollow trees as well as all trees with bird nests in clearcuts. This allows biodiversity features of both living and dead trees to be better preserved in FSC certified forest areas.

Retaining trees in a harvested area can allow forest species that require mature trees and their associated biodiversity features to persist in the area until the forest has regenerated. Many tree-living fungi, lichens, invertebrates, and small mammals can be sustained in this way. Retained standing dead trees also contributes to the biodiversity of harvested areas with sun-exposed dead wood, favored by many red-listed beetle species.

FSC certified forest in Estonia

Currently over 1.2 million hectares (ha) of Estonian forest are FSC certified. This is all state-owned, except for 10 000 ha that is private-owned. This amounts to half of the forest area in Estonia.

DEAD WOOD

The FSC standard requires all dead trunks with diameters above 25 cm, as well as all standing dead trees, to be preserved in FSC-certified forests. Dead wood serves a fundamental purpose in forest ecosystems, providing habitats for a variety of forest dwelling organisms, food for saprotrophic species of invertebrates and fungi, substrates for lichens, fungi and bryophytes to colonize, shelter for small animals, and nesting sites for many birds and small mammals. Due to a history of less intensive forestry practices, Estonian forests typically harbor higher volumes of woody debris than other European boreal forests; however, the diversity of dead wood types in Estonian forests tends to be low. A higher diversity of dead wood creates a larger variation of habitats for saprotrophic species, including many specialist species. By retaining both living biodiversity trees and standing dead trees, FSC certification also contributes to the input of fallen dead wood over time as trees are allowed to die naturally.

FOREST DRAINAGE

The FSC standard prohibits the construction of new drainage ditches, thereby contributing to the proportion of wet forests maintained in the landscape, and allowing their natural ecosystems to be maintained. Preserving forests with their natural water regime is important for forest ecosystem stability, and to preserve the native biodiversity in different forest types. Estonian studies have shown negative effects of drainage of wet forest types on lichens, bryophytes, amphibians, fish, and invertebrates. Wet forests harbor more biodiversity features than other forests, such as a higher proportion of dead wood, shaded areas, and high structural variation. Historically, wet forests have been less intensively managed, which also contributes to a high proportion of old-growth features present in wet forests.

OTHER BIODIVERSITY CONSIDERATIONS

Some biodiversity considerations in the FSC standard were difficult to compare to equivalent requirements in Estonian legislation, or could not be supported by existing literature. Landscape planning is an integral concept for managing biodiversity at large spatial and temporal scales, and the FSC standard and legislation address it through different requirements: for instance, the FSC standard requires existing forest edges to be maintained as stable ecosystems, while legislation requires the protection of areas such as shores, riverbanks and wildlife migration routes. Since landscape planning is interlinked with many other aspects of biodiversity conservation, the effects of FSC certification are difficult to compare with those of legislation in this way. Both the FSC standard and legislation also give guidelines for minimizing any negative impacts by forest roads and damage to the ground and water within forests, although these guidelines are difficult to compare due to a lack of evidence regarding their direct effects on forest biodiversity.

CONCLUDING REMARKS

The benefits of FSC certification for forest biodiversity are apparent regarding conservation requirements that are not covered by Estonian legislation to the same extent, and for which scientific research is available to show the link between requirements and biodiversity benefits. This includes preserving different dead wood types, prohibiting forest drainage, and maintaining noble hardwoods. In other cases, gaps in the available literature limit our understanding of the benefits FSC requirements provide for biodiversity, such as for forest roads and damage to ground and water. A lack of long-term, large scale studies and studies applied directly to FSC certified Estonian forests also limits our ability to evaluate the cumulative effects of FSC certification on biodiversity.

When evaluating the contribution of the FSC standard to biodiversity, one must not forget that biodiversity is but one of the three pillars of FSC and sustainable forestry, together with social considerations and economic viability. Comparing the legislation and requirements of the FSC standard provides a methodology to show a theoretical difference, and potential impacts of FSC certification. In real life some forest owners may have tree retention at much higher levels than the legislation requires, without being certified, and on the other hand the legislation may not always be enforced as intended. FSC certification, with the annual audits, can therefore also have a big influence on law enforcement.

It is worth noting that not all forest biodiversity may be sustained in a managed forest area. For example, some species may require large areas of unmanaged forest, rather than fragments of protected forest throughout a landscape, to survive, while other forest species may not be able to survive on the few trees that are retained in harvested areas. As such, FSC certification should not be viewed as a replacement for other, large-scale conservation practices; rather, FSC certification functions as a complementary tool to other conservation practices, allowing forest biodiversity to be managed in line with sustainable forestry practices.

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Retention trees can help some species dependent on mature trees to persist during the open phase after harvesting. Photo by Indrek Talpsep.

A Three-toed woodpecker. Woodpeckers require development of mixed forest stands, and the preservation of native tree species and dead wood: all biodiversity considerations included as FSC requirements. Photo by Asko Lõhmus.

Lobaria pulmonaria is a red-listed epiphytic lichen with specific habitat requirements, colonizing mature hardwood trees such as ash, aspen and oak, in well-connected old-growth forests or forest patches. Studies show that the FSC requirements support the survival of this species as well as many other red-listed lichens associated with the same habitats. Photo by Asko Lõhmus.